October 8, 1960

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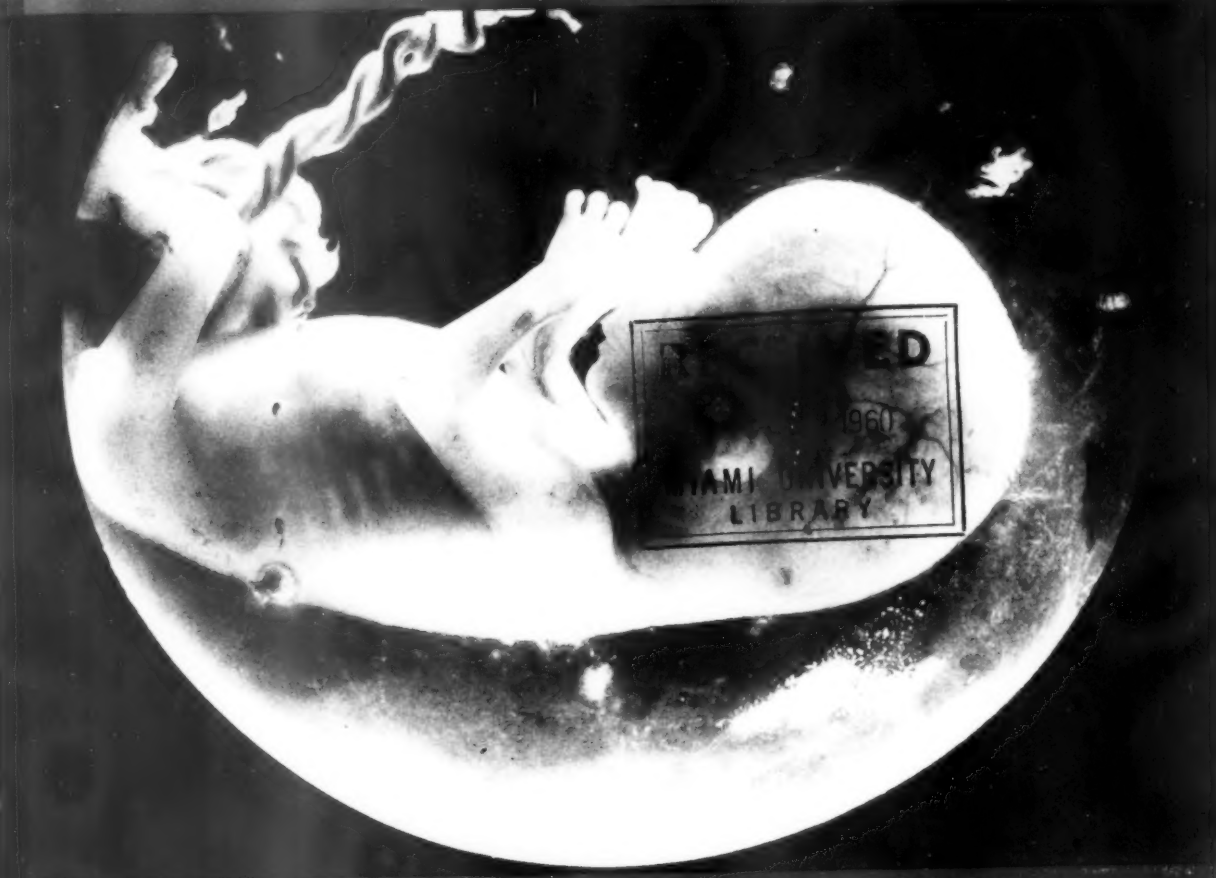

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Normal Human Fetus

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MEDICINE

Virus in Human Cancer

Virus injections do not increase occurrence of cancer in hamsters but produce unique deformities including fragile bone structure, small size, flattened forehead, protruding eyes.

➤ FOR THE FIRST TIME a virus found in human cancer has produced a new and characteristic disease in laboratory animals. Researchers are one step closer to solution of the cancer problem with discovery of a virus associated with human cancers.

Dr. Helene W. Toolan of the Sloan-Kettering Institute, New York, has announced that studies she began with injections of hamsters two years ago have been continued and confirmed by associates.

When inoculated into newborn hamsters the virus produces an unusual deformity characterized by small size, flattened fore-face or microcephalic domed head, protruding eyes and tongue, absent or abnormal teeth and fragile bone structure.

The virus has been found in all eight of the transplanted human cancers tested but not, so far, in the cancer tissue itself nor in the tissues of normal individuals.

Dr. Toolan in an interview emphasized the fact that although the virus has been found in association with human cancers it is not known yet whether or not it is a factor in the cause of cancer or has any connection with cancer development.

"By using hamsters," she said, "we have set up an indicator system—a way of testing."

The virus has an affinity for bone. It produces unique deformities in hamsters when they are inoculated within 48 hours after birth or when the embryos are injected from one to seven days before birth.

The virus injections have not been found to produce any increase in cancer occurrence in the hamsters, a large number of which are now more than two years old.

Passage of the virus from newborn hamster to newborn hamster increased the infectivity of the agent, and the animals died at progressively earlier stages.

The virus has been found in the tissues of rats bearing transplanted human cancers but not in the tissues of normal rodents or in transplantable cancers of rodents. It has not been found in human cancer cells from the same source growing in tissue culture in horse or calf sera. It has been found in tissue culture of spleen cells from infected hamsters grown in human serum, and therefore it is concluded by the investigators that horse and calf sera may neutralize the virus.

Research details appear in Proceedings of the National Academy of Sciences, Sept., 1960. Associated with Dr. Toolan were Drs. Gilbert Dalldorf, Marion Barclay, Satish Chandra and Alice E. Moore, all of Sloan-Kettering Institute for Cancer Research.

• Science News Letter, 78:227 October 8, 1960

MEDICINE

Cancer May Be Caused By Nickel in Cigarettes

➤ CIGARETTE SMOKERS and manufacturers of cigarettes have a new worry about causing cancer. The possibility of heavy smokers getting cancer from long-time inhalation of the trace amounts of nickel in cigarette tobacco was suggested in Chicago at a joint meeting of the American Society of Clinical Pathologists and the College of American Pathologists.

Drs. F. William Sunderman and F. William Sunderman Jr. of the Jefferson Medical College of Philadelphia reported experiments with rats, a species notably resistant to the induction of pulmonary cancer.

The rats were subjected to 30-minute inhalations of nickel carbonyl in concentrations of four parts per million three times a week for one year. Two or more years after the first exposure, cancerous tumors were observed.

Estimates of the amount of nickel that might be inhaled by heavy smokers of cigarettes, the researchers say, are similar to that proved cancer-producing in rats.

The hazards of exposure of industrial workers to nickel carbonyl or nickel dust have been studied previously by the Jefferson Medical College laboratory staff. It is well established that workers who have been chronically exposed to inhalations of the nickel compounds have a high percentage of respiratory cancer.

• Science News Letter, 78:227 October 8, 1960

MEDICINE

People Will Live Longer Physician Predicts

➤ A GENERATION FROM NOW, doctors will be keeping grandpa literally young at heart.

By controlling the body's enzyme systems, physicians will help a patient stave off degeneration and aging of the heart, blood vessels and endocrine glands, and many will be going strong at 80 years of age.

This is predicted by Dr. Morris Fishbein, former editor of the Journal of the American Medical Association and today editor of Postgraduate Medicine, Medical World News, Excerpta Medica and lecturer at the University of Chicago School of Medicine. He expects that the next generation's physicians will see a population in which 20% are past age 65 and two percent are past 100.

The noun "cripple," he prophesied, will drop out of the language as new techniques in training the physically handicapped are perfected. Mental retardation, which now afflicts approximately three percent of the population, will tend to disappear as new processes of learning are applied to child training.

Speaking at the dedication of a new Irwin, Neisler and Co. research laboratory in Decatur, Ill., Dr. Fishbein said infectious diseases such as measles, scarlet fever, whooping cough, mumps, diphtheria, respiratory disorders and polio will be virtually eliminated from the American scene.

However, he warned, physicians will have to combat "flash epidemics" of imported infections so long as these diseases exist elsewhere in the world.

• Science News Letter, 78:227 October 8, 1960

FLAT-HEADED HAMSTER—Experimental hamsters inoculated with a virus from human cancer have a flattened forehead, protruding eyes and tongue.

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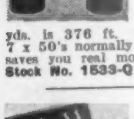

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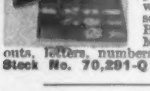

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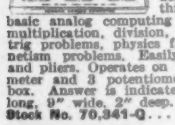

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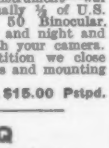

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PSYCHOLOGY

Study Conditioned Reflex

➤ RUSSIANS AND AMERICANS will get together at Town Hall in New York this month in a sort of psychological "summit conference" to report and discuss research inspired by the Russian "patron saint" of neurology and psychology, Ivan Pavlov.

This famous Russian physiologist was the discoverer of the conditioned reflex. Russian psychologists are now required by the Government to confine their research to that based on the classic work of Pavlov, but their American colleagues say that the Russians can do all sorts of research and label it "conditioned reflexes." American psychologists also hold Pavlov in the highest esteem.

Seven top Russian scientists, six of them members of the U.S.S.R. Academy of Medical Sciences, are expected to report their latest research at this meeting, which will be held Oct. 13-15 under the joint auspices of the New York Academy of Sciences and the U.S.S.R. Academy of Medical Sciences.

All seven of the Russians have promised to be present although one qualified his promise with "if the weather is favorable."

Naturally, research reported by the Russian scientists will be related in one way or another to conditioned reflexes. Dr. S. A. Sarkisov will present current data on the structure and function of the human brain. Dr. P. K. Anokhin will talk about the brainwave study of the interrelations of different parts of the brain in conditioned reflexes.

Dr. P. S. Kupalov will report on normal and pathological nervous processes in the higher divisions of the brain. Dr. V. V. Zakusov will discuss the effects of drugs on conditioned and unconditioned reflexes. The effect of irradiation on brainwaves during the formation of reflexes will be the topic of Dr. V. G. Rusinov.

Dr. A. V. Snezhnevsky will discuss the treatment of mental patients with drugs that act on the mind. And Dr. E. A. Asratyan, who is a member of the U.S.S.R. Academy of Sciences, will report on the initiation and localization of cortical inhibition in elements of the condtioned reflex arc.

American scientists contributing to the meeting will not confine their reports to research on conditioned reflexes, but, like the Russians, will report recent research. Dr. Horace W. Magoun of the University of California Medical Center, Los Angeles, will discuss recent contributions to the electrophysiology of learning. Dr. Nathan S. Kline of Rockland State Hospital, Orangeburg, N. Y., will speak on the pharmacology of learning.

• Science News Letter, 78:228 October 8, 1960

PHOTOGRAPHY

Picture of Human Fetus Gets Double Award

See Front Cover

➤ THE PHOTOGRAPH of a normal human fetus, seen on the cover of this week's SCIENCE NEWS LETTER, has received a double award at Salt Lake City, Utah, as part of the series presented annually for excellence in scientific photography by the Biological Photographic Association, founded at Yale University in 1931.

The picture received first prize in the category of monochrome prints, specimen photography, and also the Medical Education Award co-sponsored by Postgraduate Medicine. The photographer was James H. Peacock, Toronto, Canada.

• Science News Letter, 78:228 October 8, 1960

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CHEMISTRY

Make Better Gasoline

➤ HYDROGEN FLUORIDE alkylation units have been improved recently with resulting lower operating costs, improved gasoline quality and reduced original costs.

E. R. Fenske of the Universal Oil Products Company reported at a symposium on advances in refinery techniques that the quality of gasoline produced in these units now far exceeds that produced formerly and at less than half the cost.

Mr. Fenske told the members of the American Institute of Chemical Engineers meeting in Tulsa, Okla., that the improvement of these units was due to the use of better equipment, the reduction of corrosion and greater operating flexibility. Construction and maintenance costs were reduced by the use of stainless steel for most construction materials and by the use of monel metal where severe corrosion was expected.

Hydrogen fluoride alkylation units now are producing gasoline of 105 to 108 octane rating. This exceeds the requirement of present-day autos.

Within ten years automobiles will require gasoline with an octane rating of 105.

R. F. Kress, H. W. Nagel and H. E. Reif of the Sun Oil Company informed the meeting that the production of such premium fuels creates a problem for the average refinery. Two solutions were discussed, the reprocessing of gasoline with a low octane rating and the building of new plants designed to produce gasoline of satisfactory octane rating.

Gasoline utilized in automobiles today has octane ratings ranging from 80 to 90. The octane rating measures the anti-knock quality of gasoline. One hundred was originally considered to be the ideal rating.

• Science News Letter, 78:229 October 8, 1960

Acrylonitrile Process

➤ THE COST of plastics and synthetic rubber produced from acrylonitrile will be decreased because of a new process that produces this chemical in one step from propylene, ammonia and air.

A large commercial plant using this process began operation this year at Lima, Ohio, according to a report by Franklin Veztch, engineer of the Standard Oil Company (SOHIO), to the meeting of the American Institute of Chemical Engineers in Tulsa, Okla.

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Convert Oil Residues

➤ THE STEADILY INCREASING DEMAND for chemical raw materials challenges engineers to develop processes for the conversion of petroleum residues to products of greater value, H. Beuther, J. B. McKinley and R. A. Flinn of the Gulf Research and Development Company, Pittsburgh, told the American Institute of Chemical Engineers meeting in Tulsa, Okla.

Hydrogenation shows the greatest promise for producing more valuable products from petroleum residues as well as a higher product quality, they said.

A pilot plant operation of such a process was described by M. C. Chervenak and C. A. Johnson of Hydrocarbon Research, Inc., New York.

• Science News Letter, 78:229 October 8, 1960

Corrosion Prevented

➤ CORROSION is now prevented in the chemical process industry by placing a positive charge on the metal to be protected.

Carl E. Lock, Merle Hutchison and Norman L. Conger of the Continental Oil Company, Ponca City, Okla., reported to the meeting of the American Institute of Chemical Engineers in Tulsa, Okla., that such a positive charge produces "passivity" in the metal.

This method is called anodic protection. Anodic protection has been successfully applied to the sulfuric acid industry.

• Science News Letter, 78:229 October 8, 1960

U. S. Oil in Southwest

➤ THE SOUTHWESTERN states of Arizona, New Mexico, Texas, Oklahoma and Louisiana have proven oil reserves estimated at 69% of the total United States reserves and 82% of the total U. S. natural gas reserves.

John M. Dale of the Southwest Research Institute, San Antonio, Texas, reported to the American Institute of Chemical Engineers meeting in Tulsa, Okla., that these states have approximately three-fourths of the nation's petroleum reserves and 40% of the refining capacity of the nation.

• Science News Letter, 78:229 October 8, 1960

HIGHWAY GETS CHECK-UP— The antenna on top of the automobile is a photo-recording device for inspecting highway surfaces.

Oxygen in New Process

➤ OXYGEN instead of air is being used in a new commercial process that oxidizes hydrocarbons to produce a long series of important organic chemicals at a Celanese Chemical Company plant near Bishop, Texas.

James M. Robertson of that company reported the development of the process to the meeting of the American Institute of Chemical Engineers in Tulsa, Okla.

Previous processes utilized air instead of the 95% pure oxygen to accomplish the oxidation of hydrocarbons.

The petrochemical industry oxidizes hydrocarbons such as propane and butane from natural gas to form a large number of aldehydes, ketones, alcohols and olefin oxides. The oxidation of hydrocarbons is one of the most important sources of these compounds, so important to the chemical industry.

• Science News Letter, 78:229 October 8, 1960

TECHNOLOGY

New Safety Device For Alerting Drivers

➤ MOTORISTS may soon have an electrical safety device that warns them if they approach too close to a pavement edge or center line. Such a device has already been developed by General Motors Corporation and will be tested in Milford, Mich.

A wire in the center of each traffic lane radiates low frequency power. Coils on either side of a car's bumper pick up electrical signals from the road. Thus if the car veers, one of the two coils gets a big boost in its signal and feeds it to one of two warning lights. The signal can also be fed to a speaker to produce an audible warning.

• Science News Letter, 78:229 October 8, 1960

TECHNOLOGY

Surfaces of Highways Can Be Photo-Recorded

➤ IF YOU SEE a strange-looking automobile with elevated antenna-like gadgets rolling along the highway, do not be afraid that it is a new-fangled device to check if you are speeding. It actually will be a photo-recording device for inspecting highway surfaces introduced by the Aero Service Corporation of Philadelphia. A strip camera can keep track of the road surface in a fraction of the time it takes a person walking or driving.

• Science News Letter, 78:229 October 8, 1960

ROCKETS AND MISSILES

Double Space Payloads

➤ THE UNITED STATES is on its way to doubling payloads in space with a system that sounds like the ingredients of a new tooth paste: liquid fluorine with hypergolic action.

Combined with other elements, fluorine becomes a fluoride compound safe enough for treating water and tooth paste. But liquid fluorine itself is a dangerous, hard-to-handle fuel. In its natural state it is a greenish-yellow gas of the chlorine family. It must be kept at 306 degrees below zero Fahrenheit to maintain it in a liquid state.

It has been recognized as the most powerful of all oxidizing agents—so powerful that special methods for shipping and handling large quantities had to be developed. Allied Chemical's General Chemical Division has developed these methods and has supplied more than 40 tons of liquid fluorine to the Bell Aerosystems Company for rocket development.

Bell used safety measures similar to those with other rocket chemicals and has had a perfect safety record.

Under contract with the National Aeronautics and Space Administration, Bell has built a rocket engine designed to prove the feasibility of fluorine and hydrogen. Used for upper stages of rocket vehicles, such a rocket engine would have more power than those used now.

It would need no ignition devices, thus reducing the weight of the stage. The new engines have hypergolic or spontaneous ignition.

The Able stage of the Atlas-Able combination that will soon carry a highly instrumented space experiment station into orbit around the moon also has hypergolic ignition, but it uses a different fuel.

Bell has conducted full-scale firings of the new fluorine-hydrogen engine. Company engineers predict similar systems can double payloads. NASA officials agree.

• Science News Letter, 78:230 October 8, 1960

ASTRONAUTICS

No Women in Space

➤ THE RULE OF "LADIES FIRST" does not apply in outer space, Brig. Gen. Don Flickinger, USAF, assistant for bioastronautics, Headquarters Air Research and Development Command, Andrews Air Force Base, told SCIENCE SERVICE.

The emphasis on the official United States program for manned space flight still is on "man," he said, despite reports that a young woman pilot has been "tested and qualified" as an astronaut by a top scientist for the National Aeronautics and Space Administration.

Dr. Randolph Lovelace, chairman of NASA's Life Science Committee—the group that participated in the selection of the seven Mercury Project astronauts—last month named Jerrie Cobb, 28, of Oklahoma City, Okla., as the first woman candidate qualified for space duty on the basis of tests given her at the Lovelace Clinic in Albuquerque, N. M.

Neither the tests given Miss Cobb, nor the period of testing, met the standards which guided the selection of the Mercury astronauts, Gen. Flickinger said. "Adequate testing for such selection takes a matter of months and, of necessity, is far more rigorous than that to which Miss Cobb was exposed," he added.

Women have been ruled out of pioneer space flights for practical as well as valid medical reasons, Gen. Flickinger explained. Practically, there is the problem of designing and fitting a space suit to accommodate their particular biological needs and functions.

In order to determine adequately women's physiological and psychological resistance to the stresses of a space environment, biomedical studies would have to be made on hundreds of the fairer sex. It cannot be done on the basis of testing one or even the dozen women now undergoing preliminary testing at the Lovelace Clinic, Gen. Flickinger said.

• Science News Letter, 78:230 October 8, 1960

ROCKETS AND MISSILES

Echo Retains Shape

➤ THE BALLOON SATELLITE Echo has now been in orbit for more than seven weeks. And all that travel has left it with a few wrinkles but still in good shape.

Radio beams are still being bounced off it. Scientists are still studying slight changes in its orbit. These changes are caused by the pressure of sunlight on the large but light structure.

Scientists on the East and West Coasts and even in England and France have sent or received messages via Echo.

It is, however, no longer seen as frequently as earlier. On many of its passes at night it is eclipsed by the earth, just as the moon sometimes is, and therefore it reflects no light.

Echo will stay in the earth's shadow for long periods until late December when it will enter another phase in which it orbits in the sun's light for longer and longer periods and will again be visible several times each night.

Scientists had thought that when Echo first entered the earth's shadow it might collapse—the gases inside would cool and exert no pressure to keep the satellite expanded.

But Echo did not collapse, apparently because the pressure from outside the satellite is almost non-existent. The 100-foot balloon, made of aluminized plastic film, also survived the annual Perseid meteor shower. The shower hit the week end following Echo's launching on Aug. 12.

Passing these tests, Echo now may stay in its 1,000-mile altitude orbit for as long as a year before gravity pulls it low enough to burn from the friction of the earth's atmosphere.

Where does the National Aeronautics and Space Administration go from here?

Proposals and preliminary design studies for future inflatable structures include:

1. A great structure with shiny reflectors for focusing the sun's heat for conversion to electricity. Such a device could greatly increase the power supplies now available to satellites.

2. An inflatable glider or auxiliary wings for slowing a space ship's re-entry into the earth's atmosphere.

3. A sailplane that would move through space using the pressure of the sun's light in the way a sailboat uses the pressure of the wind. One expert believes a sailplane could get to Mars in 118 days—less than half the time he estimates a chemical rocket would take.

4. An inflatable laboratory or repair station in space.

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ROCKETS AND MISSILES

Rocket Communications Will Travel 1,400 Miles

➤ IN AN EMERGENCY, the United States may be able to get messages through to stations miles away via rocket.

A rocket that can broadcast messages from 300 miles up has been tested at Eglin Air Force Base, Fla., by the Air Research and Development Command as part of project "Tattle Tale."

From 300 miles up, a message will travel 1,400 miles along the earth's curvature. The communications payload, developed by the Hughes Aircraft Corporation, was carried aloft by an Aerobee rocket.

• Science News Letter, 78:230 October 8, 1960

TECHNOLOGY

Tape Unit Plays 40 Hours For Long-Distance Flights

➤ A TAPE RECORDER that will play unattended for 40 hours has been designed to provide airline passengers with entertainment on long-distance flights. The recorder utilizes a one-inch tape with 40 tracks of recording on it. The unit was developed by Epsylon Industries in Middlesex, England.

• Science News Letter, 78:230 October 8, 1960

OCEANOGRAPHY

Do Sea Serpents Exist?

➤ THOSE STORIES about giant sea serpents may not be so far-fetched after all.

More than one knowledgeable scientist believes in the possibility of their existence, and Dr. Robert J. Menzies, University of Southern California marine biologist renowned for his part in discovering Neopilina, a tiny sea animal believed to have been extinct for 300,000,000 years, admits that he has gone fishing for a sea monster.

"I literally 'fished' for him with a giant hook nearly two feet long which was baited with a squid that would have been a mouthful even for a monster. I got the hook back, badly bent, large and strong as it was."

The flurry of interest in sea monsters gained new impetus in September, 1959, when Dr. Anton Brunn of Denmark described captured larval eels six feet long.

"Thus far, no adult of this particular eel species has ever been found," Dr. Menzies said.

But the unusually large size of the larvae suggested that the parents must be of huge size. The adult eels, perhaps 30 to 50 feet in length, hooping their way across the ocean waves, might account for some of the sea serpent legends.

"I know that some of the stories told about sea monsters and sea serpents sound weird," Dr. Menzies said. "But it would be even more ridiculous to pooh-pooh them completely and not even look for the monsters. I have searched for them as a part of other oceanographic studies. I am not prepared to say that there are such things; neither would I deny they exist."

Dr. Menzies said the finding of Neopilina suggests that even more important discoveries are awaiting science in the vast marine abyss. If a sea monster is found, he believes, the discovery will be made in the great ocean trench south of the Isthmus of Panama and along the Chilean coast.

The National Wildlife Federation in Washington, D. C., has just reported another find of a three-foot larval eel taken by Prof. L. R. Richardson of Victoria University in New Zealand. Possibly the baby of a 30-foot adult, this immature larval eel has a reptilian head, large sharp teeth and well developed eyes. It is thought to be a different species from those taken by Dr. Brunn.

• Science News Letter, 78:231 October 8, 1960

PHYSIOLOGY

Rabbits With Plastic Hats Are Wired for Smell

➤ RABBITS with plastic hats wired for smell are being used in experiments aimed at using animals to "smell trouble" in unfamiliar environments, perhaps even on strange planets.

Dr. David G. Moulton, physiology research associate at Florida State University at Tallahassee, said the plastic hats, comfortably held in place with dentist's cement, contain 13 thread-sized electrodes that "tap in" on the animals' brain responses to various odors.

To find out how the brain sorts out various smells, analyzes them from a mixture and then alerts the animal by sending messages to the olfactory centers in the brain, Dr. Moulton places the rabbits in a "constant environment chamber." The chamber is soundproof and has a one-way glass that allows the observer to look in, but the rabbits cannot see out and are not disturbed by the sight of humans.

Bottled odors such as wolf gland, skunk oil, deer musk, carrot oil, fox gland and various chemical compounds are piped into the chamber. The rabbit sniffs the odor to be tested through a face mask, and an amplifier magnifies the tiny currents emitted from the olfactory bulbs in the brain.

An audio-system allows the researchers to listen to the sound of the nerve impulses in the brain which are also photographed and recorded from the oscilloscope. Another instrument adds up the impulses per-unit time on ticker tape.

The scientist's eventual goal is to work out a tele-transmission device such as that used in space satellites, with which he can record the impulses to and from the brain over long distances while the animal roams its natural environment.

An animal's responses to smell could give a researcher valuable information about the environment.

• Science News Letter, 78:231 October 8, 1960

GEOPHYSICS

AGU Creates Committee On Planetary Science

➤ THE PLANETS of the solar system appear to be slipping from the grip of astronomers into the waiting hands of geophysicists. The American Geophysical Union, usually concerned with the physics of this old world, is prepared to take over the planets as their own.

The president of the AGU has created a planning committee on planetary science. And just a month before deadline for its 1960 meeting the AGU made an unprecedented call for planetary reports and organized eight new sessions.

Dr. Homer E. Newell of the National Aeronautics and Space Administration is chairman of the new committee. He writes in Transactions, American Geophysical Union, 41:407, 1960, that the techniques needed for manned and unmanned exploration of the solar system are not astronomical, but geophysical.

"The great body of individuals with competence in the use of these tools and techniques is to be found in the AGU," Dr. Newell says.

"Likewise, in the international field; whereas the International Astronomical Union, the International Scientific Radio Union and the International Astronautical Federation, all have interest of one sort or another in the study of the planets, nevertheless the most natural home would seem to be the International Union of Geodesy and Geophysics."

• Science News Letter, 78:231 October 8, 1960

UNNATURAL MOTHER—The female Megapode, shown by S. Dillon Ripley, director of Yale's Peabody Museum, abandons her eggs and leaves them to the male bird. George A. Clark, Yale ornithologist, holds a Megapode egg, which is part of the mystery of this Australian bird species. Under a National Science Foundation grant, Mr. Clark will embark on a four-month expedition this year to study the puzzling behavior of Megapodes.

CHEMISTRY

Fallout Measured Faster By New Chemical Method

➤A NEW METHOD for rapid detection and measurement of hazardous fallout in milk was described by Miss Doris C. Sutton, a chemist with the U. S. Atomic Energy Commission, at the American Chemical Society meeting in New York.

The method, making use of a series of chemical techniques, has particular value for field testing in cases of accidental pollution from nuclear processes, she pointed out.

Long-term analysis has proved adequate for monitoring air, water and food materials for radioactive strontium (strontium-90) which is a known cause of leukemia and bone cancer, resulting from atomic testing.

"The increasing use of nuclear reactors as power sources, however, creates the possibility of accidental local contaminations many orders of magnitude greater than the fallout level," Miss Sutton explained. In such emergencies a rapid method for accurate measurement of strontium-90 in a variety of foodstuffs would be needed, "especially in milk," she said, adding that the rapid estimate of strontium-90 content in milk is a maximum value and is, therefore, suitable for emergency screening.

Using the new method, 20 samples of milk can be analyzed in four to five hours, as compared with the three or four weeks required for conventional analysis. Accuracy of the chemical detection and measurement has been confirmed through tests on 1960 milk, which agree with those previously obtained through conventional time-consuming methods.

The new method separates strontium-90 from other materials by means of a special acid (ethylenediaminetetraacetic acid or EDTA), which has the ability to attach itself to the strontium atoms. The radioactive strontium can then be measured by radiometric methods.

• Science News Letter, 78:232 October 8, 1960

TECHNOLOGY

New Film Developed To Filter Sea Water

➤ A MEMBRANE to filter the salt out of sea water has been developed at the University of California, Los Angeles. It is said to be 100 times more effective than previous commercial membranes.

The new and promising filter was developed by research engineers Sidney Loeb and Srinivasa Sourirajan. The membrane, or film, has a large number of tiny pores that in effect filter the salt water and separate the brine from the potable water.

To make their film, the UCLA engineers mix cellulose acetate with aqueous magnesium perchlorate solution and acetone, and then cast the sticky mixture cold on a glass plate.

After putting the glass plate into cold water, a film four thousandths of an inch thick is stripped from the plate and then shrunk slightly in hot water. The finished membrane, which can filter water 100 times faster than previous commercial films, is mounted on each side of a porous steel disk.

Any number of disks are then stacked in a frame press, salt water is circulated through the unit at 1,500 pounds per square inch pressure, and the desalted water flows out from the bottom of the unit.

With their present film, Mr. Loeb and Mr. Sourirajan have been able to get potable water at the rate of eight gallons a day per square foot of membrane area. The potable water is produced in a single filtering from a brine containing a 5.25% salt concentration, which is much saltier than ordinary ocean water.

Mr. Loeb and Mr. Sourirajan believe that their process holds possibilities for future large-scale, commercial use, because the film is both cheap and durable, the equipment is simple and can run 24 hours a day without maintenance, and power requirements are as low as for any other desalinization method.

• Science News Letter, 78:232 October 8, 1960

PUBLIC HEALTH

Milk Radioactivity Within Safety Levels

➤ LEVELS OF RADIOACTIVITY in milk reported on last month by the U. S. Public Health Service were within the level recommended as a guideline by the Federal Radiation Council.

The milk samples reported on were collected in March and April and were analyzed at Public Health Service laboratories for measurements of strontium-90 (a known cause of leukemia and bone cancer), cesium-137 and for calcium content. It takes about four months from the time samples are collected to complete a report.

Since March, 49 new milk monitoring points have been added to the ten previously in operation, bringing to 59 the total number of stations throughout the nation. Nineteen new stations are reporting for the first time in the PHS monthly technical publication "Radiological Health Data," Sept. 1960, along with the ten original stations.

The new milk stations are located from Hawaii to Alaska. The highest levels of strontium-90 were measured in milk from the New England area, but these were less than half the recommended concentration. The higher levels in this area are in keeping with the general pattern of fallout which tends to be higher in concentration in the northern part of the United States and Canada than elsewhere.

• Science News Letter, 78:232 October 8, 1960

TECHNOLOGY

Building Codes Allow Use Of More Plastics

➤ PRESENT BUILDING CODES permit the use of more plastics than are now used in building construction, a survey by the Southwest Research Institute, San Antonio, Tex., has shown. As the basis for a study of the relative fire-safety of plastic building products, the Institute has tabulated permissible uses of such components under major model codes.

• Science News Letter, 78:232 October 8, 1960

IN SCIEN

CHEMISTRY

Scientists Demonstrate Heat Control Over DNA

➤ HEAT CONTROL over the essential chemical of heredity in living cells, DNA, has been demonstrated by scientists of the Rockefeller Institute, it was reported to the American Chemical Society meeting in New York.

The precise, critical temperatures that will destroy an entire packet of genes, the bearers of heredity traits, have been found. Heat of slightly less can be used to knock out individual genes.

The research showing control of DNA, deoxyribonucleic acid, was done by Dr. Muriel Roger, assistant professor, and Dr. Rollin D. Hotchkiss, member and professor. DNA prepared from pneumococcus bacteria was used. The critical temperature destroys all the genes in a single DNA molecule, while at a sub-critical point, individual genes that carry hereditary characteristics are knocked out.

The influence of the heat is to destroy the helical structure of DNA, which is believed to consist of two long strands of atoms, wound into a circular, twisting configuration.

The temperatures involved range from about 185 to 198 degrees Fahrenheit. It takes only a few minutes for the higher temperatures to inactivate DNA, whereas the selective destruction of genes takes place after a lag of about two hours.

It is hoped that the new methods can be used to make a rough structural map, partly chemical and partly physical, to plot the various genes and linkage groups that have such control and determination over the stream of life.

• Science News Letter, 78:232 October 8, 1960

PUBLIC HEALTH

Preventing Ills of Aged Is Lifelong Process

➤ OLD PEOPLE must be protected from the three D's—disease, disability and dependency. And prevention of these ills does not begin at 65; it is a lifelong process, Dr. Claire F. Ryder of the division of special health services, Department of Health, Education and Welfare, told the National Recreation Congress in Washington, D. C.

How the older person will utilize the increasing amounts of leisure time at his disposal, Dr. Ryder said, will depend on his own and his family's attitudes, the community's attitudes, his preparation for retirement, his own basic resources, his financial and living conditions and his physical condition.

Proper use of leisure time is a preventive to help forestall the onset of dependency. And recreation can be a bridge between the young and the old.

• Science News Letter, 78:232 October 8, 1960

E FIELDS

BIOLOGY

Missing Enzyme Found In Chloroplasts

➤ A MISSING ENZYME necessary for photosynthesis has been found in the chloroplasts of spinach, pea, barley and fern leaves as well as in algae. Robert Smillie, biologist of Brookhaven National Laboratory, Upton, N. Y., reports his discovery of the missing enzyme in Nature, Sept. 17, 1960.

The conversion of carbon dioxide to carbohydrates by the process of photosynthesis requires an enzyme that cuts off the phosphate group from the number one carbon atom of certain carbohydrate derivatives.

Although this enzyme has been found previously in other plant tissues, it has not been found before in the chloroplasts which are essential to the photosynthetic process. The enzyme is known as alkaline fructose-1,6-diphosphatase.

• Science News Letter, 78:233 October 8, 1960

ARCHAEOLOGY

Ancient Silver Cup Puzzles Scientists

➤ THE RESTORATION of a corrosion-encrusted silver cup made with pride by some unknown silversmith over 3,000 years ago raised a problem that is puzzling scientists. The cup was buried in the ground of Enkomi in the island of Cyprus, where it lay hidden until modern times.

The problem concerns the decoration on the cup. As a result of laboratory work, the decoration was first reported to be an inlay of a substance called niello. Niello is a mixture of the sulfides of silver and copper and is the basis of jewelry that has been made for many hundreds of years by a very tricky process handed down from father to son in Siam (Thailand) and other parts of southeast Asia.

The Enkomi cup is dated 1,400 B.C. If the niello decoration was used in Cyprus at that early date, it is a discovery of great importance to archaeologists.

But Drs. G. F. Claringbull and A. A. Moss of the department of mineralogy of the British Museum in London report they believe that the evidence suggesting the decoration might be niello is not conclusive. They believe the cup was inlaid with copper.

When first excavated, the cup was covered with green corrosion products. Preliminary examination showed the presence of gold and a black powdery substance. When the black powder was analyzed spectrographically, the results indicated that it might be niello.

The next problem was how to remove the corrosion results of some 3,000 years in the ground without destroying either the gold or the niello. Laboratory experiments with niello showed that it would resist being soaked in hot formic acid. The hot acid was therefore used to wash off the incrustation. Beneath, "the original decoration was revealed in a surprisingly fresh condition."

Dr. Harold J. Plenderleith of the International Centre for the Study of the Preservation and Restoration of Cultural Property in Rome explains why he feels the Enkomi cup was decorated in niello: The perfection of line and luster survived immersion for 20 minutes in commercial formic acid at boiling temperature without any sign of loss. The black patterns were "lustrous or splendent and enamel-like" and, where undamaged by time and the soil, the material formed a perfect tracery of shiny jet-black mass-and-line ornament in the bright silver groundwork.

The latest arguments over the cup appear in the British scientific journal Nature, Sept., 1960.

• Science News Letter, 78:233 October 8, 1960

MEDICINE

More Autopsies Needed To Find Causes of Death

➤ MORE AUTOPSIES should be performed if accurate studies are to be made of the causes of death from heart disease.

Reporting a ten-year study in the Journal of the American Medical Association, 174:384, 1960, Drs. David M. Spain and Victoria A. Bradess, with Charles Mohr, all of Brooklyn, N. Y., emphasize the importance of increased accuracy in studies being made of atherosclerotic heart disease. They report findings on autopsies performed on 1,329 men and women over 30 years of age in Westchester County, New York.

Coronary artery disease (atherosclerosis) caused 91% of the sudden deaths of 463 white men in Westchester County, who died within an hour after symptoms began. The study shows that only 52%, or 32 of 66 white women died of this cause.

The researchers show that in any community the relative frequency of the various causes of sudden death will depend on the definition of sudden death used by the physician.

The proper interpretation of the cause of death in sudden, unexplained and unexpected fatalities in adults, they say, has assumed added significance in view of the many geographical, population and other studies being made in connection with atherosclerotic heart disease.

• Science News Letter, 78:233 October 8, 1960

AERONAUTICS

Jet Noise Tells Thrust And Adds to Safety

➤ THE NOISE from a jet plane can do more than wake up a neighborhood. It can indicate the thrust of the jet engine.

A new jet thrust indicator developed by the Industrial Acoustics Company, Inc., in New York, uses this "sound" principle to provide added safety as a take-off monitor and added economy as an in-flight fuel economizer.

• Science News Letter, 78:233 October 8, 1960

BIOCHEMISTRY

Lung Cancer Triggered By Chemical Reaction

➤ A CONTRIBUTING CAUSE of lung cancer may be a chemical reaction or "defense" triggered by the introduction to the body of foreign substances. Dr. Andrew L. Reeves, biochemist at Wayne State University's department of industrial medicine and hygiene, made this report to the American Chemical Society meeting in New York.

Cancer-causing agents, found in cigarette smoke, auto exhaust and city air-pollution, injected into the windpipes of rats, provoked an immediate response in the animals' natural defense mechanisms against foreign body invasion. Scavenger cells accumulated at the site of deposition.

In about six weeks, most of the injected chemicals were cleared out of the lungs, the biochemist said. This clearing process was accompanied by temporary changes in certain chemical balances within the cells of the lung tissue.

This "response" did not altogether subside when the lungs were clear of injected matter. Some of the chemical changes continued to show up in later specimens of tissue, and to an increased extent. In this "chronic phase," Dr. Reeves, said, some cell constituents were increased which also are increased in full-grown cancer.

The absence of the cancer-provoking substance at this time seems to indicate that the cause and effect relationship between exposure and cancer growth is certainly not a direct one, Dr. Reeves emphasized.

Dr. Reeves was assisted in his research by Dr. Arthur J. Vorwald, director of the Wayne State Laboratory, and Mrs. Dolores B. Dibley, a research technician at the University.

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MEDICINE

Stomach Acid Secretion Studied in Animals

➤ ANIMAL EXPERIMENTS are giving doctors a better understanding of the mechanism that initiates secretion of stomach acid.

Dr. Morton I. Grossman of the University of California Medical School is conducting such experiments in his laboratory at the Los Angeles Veterans Administration Center.

It has long been known that the stomach starts secreting acid in response to distention of the stomach by food. This distention causes release of the hormone gastrin by th pyloric glands located at the bottom of the stomach. The hormone in turn initiates release of acid by the stomach.

Dr. Grossman has found that even when the pyloric glands are removed from experimental animals, distention of the stomach will still initiate secretion of stomach acid. This suggests an additional mechanism may be involved in stomach acid secretion.

Nervous impulses traveling to and from the stomach by way of the vagus nerve may initiate acid release independently of the pyloric glands.

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PSYCHOLOGY

Training Rough Guerrillas

Army psychologists have devised new methods for picking the men best suited to go behind enemy lines as guerrilla leaders in case of war, Tove Neville reports.

➤ WOULD YOU BE a good guerrilla leader? Could you obtain and cook rattlesnake meat if that was the only type food available? Could you get rid of an enemy silently?

A good guerrilla leader must be able to blow up bridges, dams and railroads in enemy territory where such enterprises would be very hazardous. Most likely, enemy soldiers would be on the lookout constantly, and your helpers in this dangerous work would be natives whose language you might not even know. Could you keep up your courage under such conditions and still do the job?

A guerrilla leader must also be able to live off the land, whether it be jungle, mountain, desert or arctic terrain. He must be able to walk 100 miles, carrying a full pack, with only short rests.

These are just some of the everyday tasks of the Special Forces soldier who becomes a guerrilla leader. After being trained, he is an expert at equipping and training guerrilla forces behind enemy lines, and he is also an authority on practically every type of small arms known to man. He is, besides, a diplomat, salesman, teacher and organizer all rolled into one.

In order to find out which men are the best suited to become these superoperators, the Army has developed new ways of picking soldiers with the best potentialities, Drs. Rudolph G. Berkhouse and Milton M. Maier of the Army's Personnel Research Branch reported to the American Psychological Association in Chicago.

Psychologists Took Same Training

They described how a team of psychologists, assigned to the Special Forces Research Task, studied the qualifications needed to be a guerrilla leader, then went through the same field training as the trainees and themselves learned the tasks of a guerrilla operator. Finally, they designed the tests that now make it easier to pick the human material needed for these tough jobs.

As a result, the Army can now give the tests and pick very nearly the men who would be successful in these jobs. This means that personnel not suited for the task can be eliminated from long weeks of strenuous and expensive training.

To find the best methods of picking these men, about 250 men were assigned to the Special Warfare Center at Ft. Bragg, N. C., where they had concentrated training, lasting 11 weeks. Before the training began, the group was given a battery of psychological tests.

During training, all the men were closely observed. Afterwards they were required to show how well they could do the tasks of a Special Forces operator. They had to show they knew how to use radio communications equipment, that they could use different kinds of weapons and that they could handle land navigation problems. They also had to demonstrate how to take care of such injuries as bullet wounds, abdominal wounds and a shattered jaw.

Each trainee performed for two weeks under close scrutiny. The evaluation of the performances were judged on an all or none basis. If the task was performed satisfactorily, the trainee received credit; if not, he got no credit at all.

Finally, the scores on the original psychological tests were compared with the indications of suitability for each man. Analysis of the test scores and evaluations enabled the psychologists to determine the tests given prior to training that best indicated which men should have been accepted for training and which should have been rejected.

Of all the tests tried out, four were found highly useful in finding the potentially successful Special Forces soldier.

1. Infantry Aptitude Area. The score of this test has been found previously to show combat potential. The guerrilla leader must above all be a good soldier.

2. Critical Decisions Test. The problems of this test are presented by tape recorder. The trainee is told to evaluate several possible solutions and their effectiveness in handling the problem presented.

3. Special Forces Suitability Inventory. This test measures what a man tends to do from his personal motivation rather than what he is capable of doing.

4. Locations Test. The problems involved in this test require ability to orient oneself in unfamiliar terrain. The guerrilla leader must be able to find his way around without asking directions.

In taking the tests, it is very difficult for the trainees to give right or wrong answers intentionally because there are no clearcut "right" answers. Often a trainee may think

HIGH-JUMPING—Trainees of the Army Special Forces who expect to become guerrilla leaders behind enemy lines must be able to take the high jump as one of the many tasks required to meet the Army's suitability standards for the job. Leadership, daring and courage are of prime importance.

he gives a right answer when one of the other responses would be better. Therefore it is very difficult for him to attain deliberately a score higher or lower than his abilities.

A successful detachment of Special Forces operators, consisting of one or two officers, a medic, a weapons specialist, a demolition expert and a radio operator, can be as effective against an enemy as an entire regiment because it trains the natives of an area as guerrilla forces. Each man in such a detachment is trained to do more than one job and can take over for one of the others if necessary.

Today, three Special Forces groups are in a constant training status, one in the United States, one in Europe and one in the Far East. These three groups must be prepared for immediate action at all times in the event of war.

• Science News Letter, 78:234 October 8, 1960

PSYCHOLOGY

Hazing Had Parallel Among Primitive People

▶ WHEN COLLEGE STUDENTS haze the incoming freshmen by shaving their heads or spray-painting them, or when members of a fraternal organization make the initiate walk down Main Street in girls' clothing, they are reenacting rites performed by primitive peoples for hundreds of years.

Puberty rites, initiating the young boy or girl into manhood or womanhood, are very widespread among primitive people, and some groups have secret societies with initiation ceremonies as bizarre as any hazing customs that college boys of today can think up.

Many of the primitive initiation rites include symbolic death for the initiate so that they can be "reborn" into adult life, a symbolism common to many Christian sects. And occasionally the symbolic death is so realistic, among primitive tribes, that the initiate does not survive.

Among the native tribes of Africa, similar violence is sometimes directed, not against initiates, but against victims who have provoked the ire of members of a secret fraternity. The Leopard Men in Africa, like the Ku Klux Klan in the United States, strike in the dark against their victims.

The Leopard Men wear leopard-skin cloaks and make false leopard imprints in the earth to leave the impression that real leopards have seized the victims. With clawlike knives they mutilate and lacerate the flesh of their victims.

In some areas of Africa, the Leopard and other secret fraternities have been reduced to more sociable activities, but it was as recently as April, 1945, that the police were making arrests in an attempt to break up the deadly activity of the Lion Men and Lion Women.

The African secret societies do not exist, however, merely for the purpose of organized murder. Like our own lodges, they are mutual-aid organizations.

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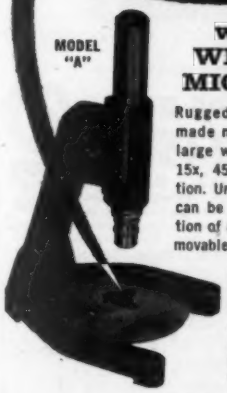

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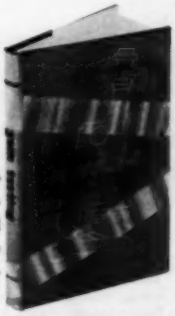

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AN ARCHAEOLOGICAL STUDY OF GIBEAH (Tell El-Ful) and THE EXCAVATION OF THE CONWAY HIGH PLACE (Petra) AND SOUNDINGS AT KHIRBET ADER—Lawrence A. Sinclair and Ray L. Cleveland—*Am. School of Oriental Research*, 97 p., 59 plates, $9. Monographs on the unpublished reports of excavations in 1933-34.

AUDIO-VISUAL TECHNIQUES IN TEACHING FOREIGN LANGUAGES: A Practical Handbook—Theodore Huebener—*N. Y. Univ. Press*, 163 p., illus., $3.25. Describes the use of both simple and elaborate aids to elementary foreign language instruction.

THE CHEMISTRY AND BIOLOGY OF SIALIC ACIDS AND RELATED SUBSTANCES—Alfred Gottschalk—*Cambridge Univ. Press*, 115 p., illus., $4.50. Monograph correlates throughout the biological observations and the chemical findings on the subject of sialic acids.

CHEMOTHERAPY IN EMOTIONAL DISORDERS: The Psychotherapeutic Use of Somatic Treatments—Frederic F. Flach and Peter F. Regan, III—*McGraw*, 314 p., $10. Systematic discussion of the clinical effectiveness of somatic therapies and the integration of treatment methods.

CIVILIAN POWER REACTOR PROGRAM, Part III: Status Report on Aqueous Homogeneous Reactors as of 1959—*U. S. Atomic Energy Commission (GPO)*, 184 p., illus., paper, $1.25.

CONTROL TECHNIQUES IN FILM PROCESSING—Walter I. Kisner, Ed.—*Soc. of Motion Picture Engs.*, 181 p., illus., $5. Principles and methods of process control as applied to processing of black-and-white motion-picture film.

DAEDALUS, Special Issue Fall 1960: Arms Control—Gerald Holton, Ed., foreword by Jerome B. Wiesner—*Am. Acad. of Arts & Sciences (Wesleyan Univ. Press)*, 404 p., paper, $2. Devoted to the problems of arms limitation attempts, to provide basic information needed for intelligent public discussion of the disarmament problem.

DELINQUENCY AND THE ADOLESCENT CRISIS—Helen L. Witmer—*Children's Bureau (GPO)*, 7 p., paper, 15¢. Considers certain of Erik Erikson's formulations about adolescents as basis for action-research.

ENGINEERING MECHANICS: Statics and Dynamics—Irving H. Shames—*Prentice-Hall*, 656 p., illus., $9.75. Presents concepts in line with current theory, with emphasis on vector treatment of statics and dynamics.

ERROR AND DECEPTION IN SCIENCE: Essays on Biological Aspects of Life—Jean Rostand, transl. from French by A. J. Pomerans—*Basic Bks.*, 196 p., $4. Includes essays on legal aspects of biological discoveries and on uses of the camera as a tool for studying life.

EXPLORING GLACIERS WITH A CAMERA—A. E. Harrison—*Sierra Club*, 71 p., 60 photographs, paper, $1.95. Brief discussion of glacial features and of the value and techniques of photographic observations, magnificently illustrated.

FIGHTER AIRCRAFT OF THE 1914-1918 WAR—W. M. Lamberton, foreword by E. F. Cheesman, Ed.—*Harleyford Pubs. (Aero Pubs)*, 223 p., illus. by J. D. Carrick and F. Yeoman, photographs, $8.50. Complete record of fighter planes of the First World War.

FIGHTS, GAMES AND DEBATES—Anatol Rapaport—*Univ. of Mich. Press*, 400 p., illus., $6.95. Mathematician investigates methods by which we can understand, and perhaps control, human conflict on the interpersonal, organizational or international level.

FREE AND INEXPENSIVE EDUCATIONAL AIDS—Thomas J. Pepe—*Dover*, 289 p., paper, $1.35. Lists 1,500 selected booklets, folders, films, charts and slides, 94% free, arranged by subject, fully indexed.

THE FUTURE OF MAN: The BBC Reith Lectures 1959—P. B. Medawar—*Basic Bks.*, 128 p., $3. Biologist's essays on the meaning of fitness, the limits of improvement, the genetic system of man, and intelligence and fertility.

GALILEO GALILEI ON MOTION AND ON MECHANICS: De Motu (ca. 1590) and Le Meccaniche (ca. 1600)—Transl., introd, and notes by I. E. Drabkin and Stillman Drake—*Univ. of Wis. Press*, 193 p., illus., $5. Classical texts on Renaissance mechanics.

GARDENS OF WESTERN EUROPE—Frederick G. Meyer, Ed.—*Brooklyn Botanic Garden*, 97 p., 148 photographs, paper, $1. Concise guide to noteworthy private gardens, parks and botanic gardens open to visitors in 15 European countries.

GENETICS: Genetic Information and the Control of Protein Structure and Function—H. Eldon Sutton, Ed.—*Macy*, 229 p., illus., $6. Transactions of group discussions at the First Conference, 1959.

HARVESTS AND HARVESTING THROUGH THE AGES—Norman E. Lee—*Cambridge Univ. Press*, 208 p., illus., $2.95. The story of early beginnings and technological progress in the world's methods of harvesting farm crops.

THE ILLUSTRATED BOOK ABOUT SOUTH AMERICA: Including Mexico and Central America—Benjamin Appel, introd. by Charles F. Berlitz—*Grosset*, 101 p., illus. by Tran Mawicke, $3.95. Children's encyclopedia about land and people.

AN INTRODUCTION TO THE THEORY OF NUMBERS—Ivan Niven and Herbert S. Zuckerman—*Wiley*, 250 p., $6.25. Intended for seniors and beginning graduate students.

LABORATORIES IN THE CLASSROOM: New Horizons in Science Education—Fletcher G. Watson and others—*Science Materials Center*, 96 p., illus., paper, $1.45. Leading science educators suggest tested methods and tools for encouraging "learning by doing" in primary and secondary grades.

LOW-TEMPERATURE TECHNIQUES—F. Din and A. H. Cockett—*Interscience*, 216 p., illus., $6.50. Emphasizes experimental and industrial applications of low-temperature techniques.

MAN AND SPACE—Clive E. Davis—*Dodd*, 95 p., illus., $2.75. Popular presentation of U. S. space projects.

MINDS AND MACHINES—W. Sluckin—*Penguin*, 239 p., paper, 95¢. Discusses the workings of electronic brains and the influence the study of them has had on modern psychology.

NORTH ARABIAN DESERT ARCHAEOLOGICAL SURVEY, 1925-50—Henry Field and others—*Peabody Museum*, 286 p., illus., paper, $8.25. Report on the geology and archaeology of a region that became the crossroads of Euroafrasia (Europe, Africa and Asia). Map included.

PARENT EDUCATION AND THE BEHAVIORAL SCIENCES: Relationship between Research Findings and Policies and Practices in Parent Education—Armin Grams—*Children's Bureau (GPO)*, 52 p., paper, 25¢.

A PICTURE DICTIONARY AND GUIDE TO BUILDING AND CONSTRUCTION TERMS — Benjamin Lipowsky and Murray Bersten—*Arco*, 57 p., 21 plates, $5; paper $3. Includes 583 definitions and 20 illustrative diagrams.

POST-CRANIAL SKELETAL CHARACTERS OF BISON AND BOS—Stanley J. Olsen—*Peabody Museum*, 61 p., illus., paper, $1.75. Field manual to help the archaeologist identify fragments of bones of the North American buffalo.

POWER TO PRODUCE: The Yearbook of Agriculture, 1960—Alfred Stefferud, Ed.—*U. S. Dept. of Agric. (GPO)*, 480 p., illus., $2.25. Covers many aspects of the great U. S. ability to

(Continued on page 238)

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Kodak

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He makes the world's best high-speed color film emulsions but tries to photograph pretty scenery through a dirty windshield.

At one of the 170 high-speed camera stations which instrument the 20,000-foot supersonic sled track at Edwards Air Force Base, Lt. Col. Earl R. Strandberg makes the acquaintance of Kodak's Walter A. Fallon. Colonel Strandberg, as chief of the Photographic Branch, has responsibility for quantitatively documenting all phenomena encountered in impact tests, static firing of rocket engines, and other activities of the Air Force Flight Test Center. Mr. Fallon, who is in charge of Kodak's color film emulsions, is visiting to observe the demands to be met by his latest products, a reversal film and its companion duplicating film. They strongly enhance information capacity through fine color distinction, sharpness, and extreme speed.

The names of the new products are *Ektachrome ER Film* and *Ektachrome Reversal Print Film*. They have a realistic quality that stimulates observers to perceive facts in super-slow-motion movies that would be lost without color.

To Walt Fallon the scenic drive through the mountains to check them out with the Colonel brought him near culmination of a hard campaign. To the Colonel, however, they represent only another step in a long history of increasing the usefulness of photography. In 1927 he talked a high school coach into letting him be the first man—more accurately, the first boy—ever to film an entire football game for purposes of analysis and self-improvement.

For information about color photographic materials for recording work, write Photorecording Methods Division, Eastman Kodak Company, Rochester 4, N. Y.

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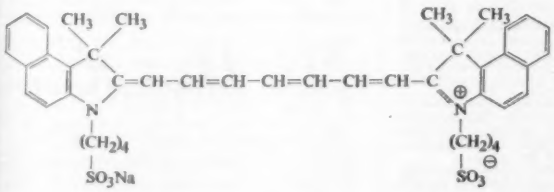

by an interesting man who admires cats, writes warmly and well of the music of Brahms, and has supervised the synthesis of an average of one new dye a day during the 30-odd years we have enjoyed the good fortune to retain him in our employ.

When a certain distinguished medical investigator asked for a dye that peaks sharply at 8000A in the infrared, our man went to work and produced indocyanine green.

Before these heart men undertake a repair job, they must know what's wrong with the way the blood streams. Dyes are sometimes used to trace underground streams of water. Blood is already colored. Moreover its color depends on where it has been last. To add another color at a given point in the circuit, to measure this color automatically at some other point, and to calculate blood volume from the dilution of the color require the heart men to back their incredibly talented fingers with a little optical physics and adult habits of mathematical thought. It was clever to simplify the equations and raise sensitivity by centering dye absorption and photocell response at a wavelength where arterial and venous blood absorb light equally and weakly—cleverer even than the previous choice of Evans Blue, which just *looks* different from blood.

Things happen fast. A quick shot of indocyanine green at safe dilution goes in. A few seconds later the 8000A absorption, as a galvanometer plots it on photorecording paper, changes for a few more seconds. The shape of the plot tells the story to a man who has learned how to figure it out.

No toxic penalties have been noted. The patient does not change color. The dye appears to be rapidly and completely bound to blood albumin. It is quickly taken up by the healthy liver and all excreted in bile. The unhealthy liver takes significantly longer. Therefore there is a prospect of eventually using it to detect unhealthy livers.

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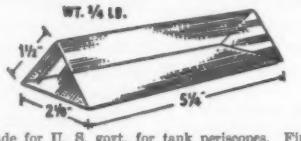

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Books of the Week

(Continued from page 236)

produce and market agricultural products with the help of technological advances.

A PRIMER ON WATER—Luna B. Leopold and Walter B. Langbein—*Geological Survey (GPO)*, 50 p., illus., paper, 35¢. Tells in nontechnical language about the relation of water to earth and describes the development and use of water supplies.

THE PROCESS OF EDUCATION—Jerome S. Bruner—*Harvard Univ. Press*, 97 p., $2.75. Noted psychologist evaluates recent experiments in teaching and concludes that the basic concepts of science can be grasped by children far earlier than has been thought possible.

PROFESSIONAL TV REPAIR SECRETS—Art Margolis—*Arco*, 141 p., illus., $2.50. Thorough guide to TV troubles and repairs.

PROJECT MERCURY—Charles Coombs—*Morrow*, 64 p., illus. by R. G. Smith, $2.75. Information for young readers about America's man-in-space program.

TUNNELS—Fon W. Boardman, Jr.—*Walck, H. Z.*, 144 p., illus., $3.50. History of the development of tools and techniques of tunnel building, for young people.

THE WIDER UNIVERSE—Paul Couderc, transl. from French by M. Davidson—*Harper*, 128 p., illus., $2.25. Fundamental information on such subjects as the structure and rotation of our galaxy and the expansion of the universe.

WORKBOOK FOR WOODY PLANTS—James W. Hardin—*Burgess*, 131 p., illus., paper, $3.50. Designed for laboratory exercises in dendrology, workbook gives characteristics of orders, families and genera.

• Science News Letter, 78:236 October 8, 1960

Questions

ASTRONAUTICS—Why can't women be astronauts? p. 230.

MEDICINE—What newly reported compound in cigarette smoke may cause lung cancer? p. 227.

PSYCHOLOGY—What were the four tests that best indicated the potentially successful Special Force soldier? p. 234.

Photographs: Cover, James H. Peacock; p. 227, Sloan-Kettering Institute; p. 229, Aero Service Corporation; p. 231, Yale University News Bureau; p. 234, U. S. Army; p. 240, Bell and Howell.

Do You Know

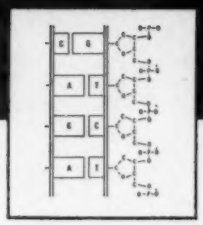
Speedometers on most vehicles vary in accuracy, depending on the amount of tire wear, temperature, load, and other traveling conditions.

Oats growing on highly fertile land, especially if it is rich in nitrogen, tend to fall over and thus make harvesting difficult.

Of all the *television* sets in the world, estimated to be about 76,000,000, more than 65% are in the United States.

The highest mortality rate from motor vehicle *accidents* are found among residents of the western and southwestern areas of the United States.

The secret of cancer— and life on Mars



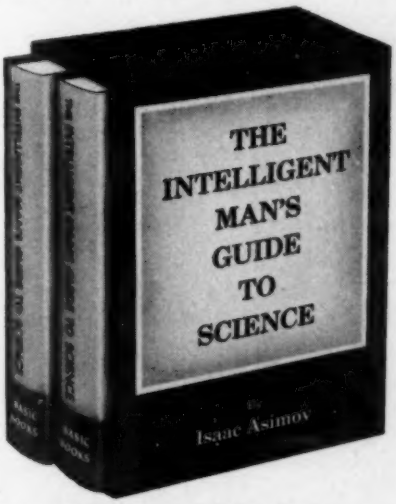
Does this symbol hold the key to both?

Perhaps no other area of contemporary research excites scientists more than the one represented by the small symbol pictured above. It shows part of a molecule of deoxyribonucleic acid—DNA—the substance believed to carry the heredity "blueprint" of every living cell, animal and vegetable.

Because DNA alterations are now believed to cause cancer, biologists and chemists are hopeful that further DNA research will lead to conquest of the disease. Evidences of substances like DNA in meteors and other outer-space objects have bolstered astronomers' and physicists' belief in the probability of life on Mars and other planets. And many geologists and other specialists believe that DNA may provide at last the answer to the age-old mystery of the origin of life.

The DNA story is only one example of the interrelationships and interdependences which are the essence of modern science. Scores of other examples are presented by the distinguished biochemist and best-selling author, Isaac Asimov, in his major new two-volume work, THE INTELLIGENT MAN'S GUIDE TO SCIENCE.

Here for the first time you will see the myriad individual strands of inquiry and research masterfully interwoven so that the entire fabric of modern science is brought into brilliant focus. When you read THE INTELLIGENT MAN'S GUIDE TO SCIENCE you will find yourself saying not once but dozens of times, "*Now* I understand!"



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By a remarkable weaving together of developments in every major field, it tells the fascinating, continuous story of scientific exploration and discovery through the ages . . . every significant accomplishment, every figure of stature from Euclid to Pauling, from Newton to Fermi, from Hippocrates to Pasteur to Freud.

Perhaps no one but Isaac Asimov could have written this book. In the words of George W. Beadle, the Nobel Prize-winning biologist: "Asimov is one of the rare ones. He knows and understands science in both its history and its substance, and he writes simply, clearly and with infectious enthusiasm.

With Asimov as your guide, you will follow the thread of scientific progress through the centuries in every field from astronomy to mathematics, from biology to the sciences of human behavior.

You will learn how a finding in one branch of science often unlocked the barriers in others . . . how a mathematical formulation (Einstein's theory of relativity) paved the way for the first self-sustaining fission reaction and the beginning of the atomic age . . . how observations by astronomers with powerful modern telescopes helped geologists and physicists compute the age of the universe . . . how an 18-year-old student's attempt to synthesize quinine for use in treating malaria led to the discovery of aniline dye and the birth of a great industry. . . .

Simple without being oversimplified, clear without any "writing down," THE INTELLIGENT MAN'S GUIDE is certain to be a household bible of science for all thoughtful readers and their families.

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PRESIDENTIAL PENCIL SET contains 33 pencils, each printed with the picture and vital statistics of a different president, plus a 34th pencil with a large question mark on it. After election, the 34th pencil will be up-dated with the picture and statistics of the new man in the White House. A 28-page booklet on the Presidency is also included in the boxed set.

• Science News Letter, 78:240 October 8, 1960

PLASTIC-CLAD TAPE RULE, made of steel, is yellow with black markings for quick reading. The tape rule's markings are protected by a plastic film not affected by most solvents, alkalies and acids.

• Science News Letter, 78:240 October 8, 1960

VARIABLE-JET LAB BURNER permits an operator to change flames by rotating the burner's head, on which there are five different burner tips. To give the glassworker still another margin of control, the burner has two gas valves plus a single oxygen valve.

• Science News Letter, 78:240 October 8, 1960

PUSH-BUTTON ZOOM CAMERA, for 8mm motion pictures, shown in the photograph, zooms smoothly from wide angle to close-up and back with the press

of power buttons. In slow motion, when the film speed increases, the lens also zooms three times faster than normal.

• Science News Letter, 78:240 October 8, 1960

LIBRARY LABEL HOLDER features an angled face that may be turned downward for high shelves and upward for low shelves so the label held can be easily read from normal eye level. Labels may be changed by inserting newly typed ones in the holders, which adhere, with the pressure of a finger tip, to shelves.

• Science News Letter, 78:240 October 8, 1960

GAME TABLECLOTH has nine game boards imprinted on it. The cloth is vinyl plastic 54 inches square. A 30-piece game kit and instructions are included.

• Science News Letter, 78:240 October 8, 1960

GIANT-SIZE WINDSHIELD SCRAPER, with an extra long handle, has a 5½-inch-wide scraping edge for ice and snow and a rubber squeegie for removing rain and mist. A saw-toothed edge on the plastic handle is designed to chip away thick ice without scratching the glass.

• Science News Letter, 78:240 October 8, 1960

RAT RUNNER chases the rodents from *the buildings with ultrasonic waves. The small device broadcasts vibrations at a frequency that is not heard by the human ear, only by rats and mice. The nerve-shattering sound forces the rodents out of a building. During flight, they can be poisoned. The sound has no effect on household pets.*

• Science News Letter, 78:240 October 8, 1960

Nature Ramblings

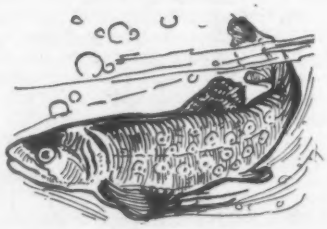
About Trout

EVERY FISHERMAN KNOWS what he means when he says he caught a trout. But it is not so certain that any other fisherman will know what he means. This is because there are trout and "trout."

In technical language, trout are members of the salmon family. Here you may run into your first difficulty. Is a salmon a trout? Well, certain members of the group are definitely tagged, such as the rainbow trout or the brook trout. But what about the humpbacked salmon? Why not humpbacked trout?

Moving away from the cold mountain "trout" streams to the warm waters of the South, you may be surprised to hear the natives brag about all the huge trout they caught last season. These so-called trout are really members of the large family of sunfishes, specifically the largemouth bass.

Calling these fine sport fish by the title "trout" is not some new invention of the Chamber of Commerce, by any means. William Bartram, the Quaker naturalist



who explored Florida in 1774, wrote a glowing account of the marvelous trout fishing to be found in the St. Johns River!

Then, moving on to salt water, there is a whole series of "trout" to be caught. There are spotted trout, silver trout, sand trout and many more. Most of these are species of weakfish or squeteagues, belonging to the croaker family.

There is a moral to this mix-up. The difficulties met with when regional names are used for fishes (or other animals, for that matter) often make identification virtually impossible. Just which trout is being referred to?

Scientists began to resort to Latin names for all plants and animals in the 18th century in an effort to avoid the confusion of local names. The system works well for the experts. They seldom confuse *Cynoscion nebulosus* with *Salvelinus fontinalis* or *Micropterus salmoides.*

But Latin is a little too much to ask of most fishermen. The American Fisheries Society has recently issued a book giving a list of standardized common names for all of the common fresh and salt water fishes of North America.

These names (most of which are already in use) will be employed by fishery biologists, ichthyologists, and fish conservation experts uniformly throughout the nation.

Who knows? In a few years maybe even the fishermen may get their "trout" straight!

—HORACE LOFTIN

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